What is claimed is:

Sub Q1>

1. A semiconductor laser device, comprising:

a doped semiconductor cladding layer;

a semiconductor optical confinement layer; and

an undoped semiconductor spacer layer positioned between said cladding layer and said optical confinement layer.

2. The laser device of claim 1, wherein said undoped spacer layer has a thickness of more than about 4 nm.

3. The laser device of claim 1 wherein said semiconductor cladding layer is n-doped.

4. The laser device of claim 3 wherein the n-doping material in said cladding layer is selenium.

5. The laser device of claim 1 wherein said undoped spacer layer comprises InP, GaInAsP, or AlGaInAs.

6. The laser device of claim 5 wherein said undoped spacer layer consists of a single layer.

7. The laser device of claim 5 wherein said undoped spacer layer consists of a single layer of GaInAsP having a bandgap-wavelength in the range of 0.92 – 1.1 μm.

8. The laser device of claim 5 wherein said undoped spacer layer consists of a graded composition layer of GaInAsP or AlGaInAs having a bandgap in the range of 0.92 – 1.1 μm.

9. The laser device of claim 5 wherein said undoped spacer layer comprises two sub-layers of GaInAsP or AlGaInAs of differing compositions, each of said two or more sub-layers having a bandgap-wavelength in the range of 0.92 – 1.1 μm.

10. The laser device of claim 5 wherein said undoped spacer layer comprises a strain compensated superlattice layer.

11. The semiconductor device of claim 1 wherein said semiconductor layers are formed by MOCVD deposition.

12. A semiconductor laser device, comprising:

a semiconductor substrate;

an n-doped semiconductor lower cladding layer;

a semiconductor lower optical confinement layer;

an undoped semiconductor spacer layer between said lower cladding layer and said lower optical confinement layer;

a semiconductor active layer for generating light;

a semiconductor upper optical confinement layer;

a p-doped semiconductor upper cladding layer; and

electrodes for current injection to said device.

13. The semiconductor laser device of claim 12 wherein said undoped spacer layer has a thickness greater than about 4 nm.

14. The semiconductor laser device of claim 12 wherein all of said semiconductor layers are formed from III – V semiconductor compounds.

15. The semiconductor device of claim 12 wherein said active layer comprises a quantum well structure.

16. The semiconductor device of claim 12 wherein the doping material in said n-doped lower cladding layer is selenium.

17. The semiconductor device of claim 12 wherein said undoped spacer layer has a bandgap-wavelength in the range of 0.92 – 1.1 μm.

18. The semiconductor device of claim 12 wherein said spacer layer consists of a layer selected from the group consisting of InP, a single layer of GaInAsP or AlGaInAs, two or more sublayers of GaInAsP or AlGaInAs of differing composition, and a superlattice structure.

19. The semiconductor device of claim 12 wherein said semiconductor layers are formed using MOCVD deposition.

S46937

20. A method of making a semiconductor laser device, comprising the steps of:

forming an n-doped semiconductor lower cladding layer on a substrate;

forming an undoped semiconductor spacer layer over said lower cladding layer;

forming a semiconductor optical confinement layer over said spacer layer; and

forming an active, light emitting semiconductor layer over said optical confinement layer.

21. The method of claim 20 wherein each of said semiconductor layers are formed using MOCVD.

22. The method of claim 20 wherein the doping material used in said n-doped lower cladding layer is selenium.

23. The method of claim 20 wherein said undoped spacer layer has a bandgap in the range of 0.92 – 1.1 μm.

24. The method of claim 20 wherein said lower cladding layer consists of n-doped InP and wherein said lower cladding layer is formed on an InP substrate.

25. The method of claim 20 wherein said undoped spacer layer consists of a single layer of InP.

26. The method of claim 20 wherein said undoped spacer layer consists of a single layer of GaInAsP.

27. The method of claim 20 wherein said undoped spacer layer consists of a two or more sublayers of GaInAsP or AlGaInAs, each of said two layers having a different composition.

28. The method of claim 20 wherein said undoped spacer layer has a thickness greater than about 4 nm.

29. A semiconductor device comprising:

a first n-doped III – V semiconductor layer formed by MOCVD,

an undoped III – V semiconductor spacer layer formed by MOCVD deposited directly on said n-doped layer,

a III – V semiconductor layer formed over said spacer layer, whereby lattice defects caused by said n-doped III – V semiconductor layer are mitigated by said spacer layer.

30. A method of making a III – V semiconductor device, comprising the steps of:

depositing a layer of a III – V semiconductor compound doped with selenium using MOCVD;

depositing a spacer layer of an undoped III – V semiconductor compound directly on said selenium-doped layer using MOCVD;

depositing an active layer comprising one or more III – V semiconductor compounds over said spacer layer.